

Ouch! Microbe X that causes disease X has gotten passed my 1st and 2nd lines of defence. BUT my 3rd line of defence will back me up!

I feel very vulnerable to disease X. I've never had it before and I haven't been vaccinated against it

My 3rd line of defence (my antibodies) target these harmful, alive microbes X and attach to them...

My doc jabs me with a needle and I receive a vaccination against disease X. The vaccination is DEAD Microbe X - it isn't harmful and won't cause disease X

The B-cells in my body recognize the DEAD microbes in my my body after the vaccination...

... phagocytes then get rid of the microbes X before they can do any harm. I am immune to disease X!!

... and my B cells produce ANTIBODIES that will fight microbe X if it enters my body.

Immunity and Vaccinations

Skin that is **intact** (not broken) stops microbes from getting into our body. **Good bacteria** live on our skin, and stop bad bacteria from causing us harm

A **sticky mucus** produced by the cells that line our nose stops harmful microbes from getting into our lungs. **Nose hairs** also stop some harmful particles from entering our lungs.

Chemicals in our **tears** help to destroy microbes that try to enter our body through our **eyes**.

Microbes that do get passed our mouth end up in our stomach. To stop the microbes from going any further into our body, **acid** produced by cells that line our stomach destroys them.

Mucus in our **airways** trap microbes. Little 'hairs' in our airways called **cilia** remove the microbes that are stuck in the mucus – this gooey substance ends up in our throat and we cough it up.

Chemicals in our saliva help to destroy harmful microbes and stop them from getting into our stomach.

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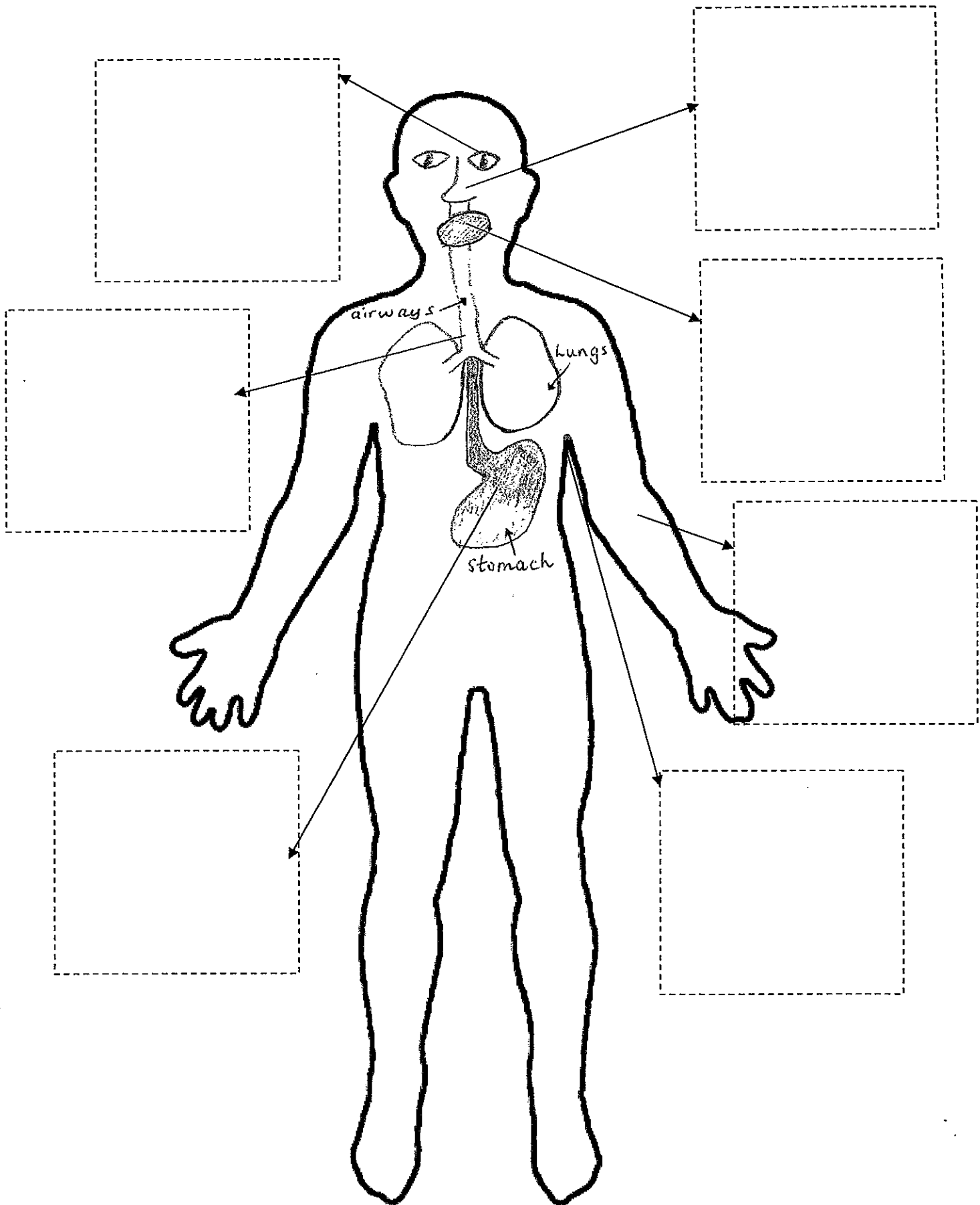
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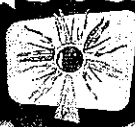
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FIRST LINE OF DEFENCE AGAINST MICROBES THAT CAUSE DISEASE
physical external barriers

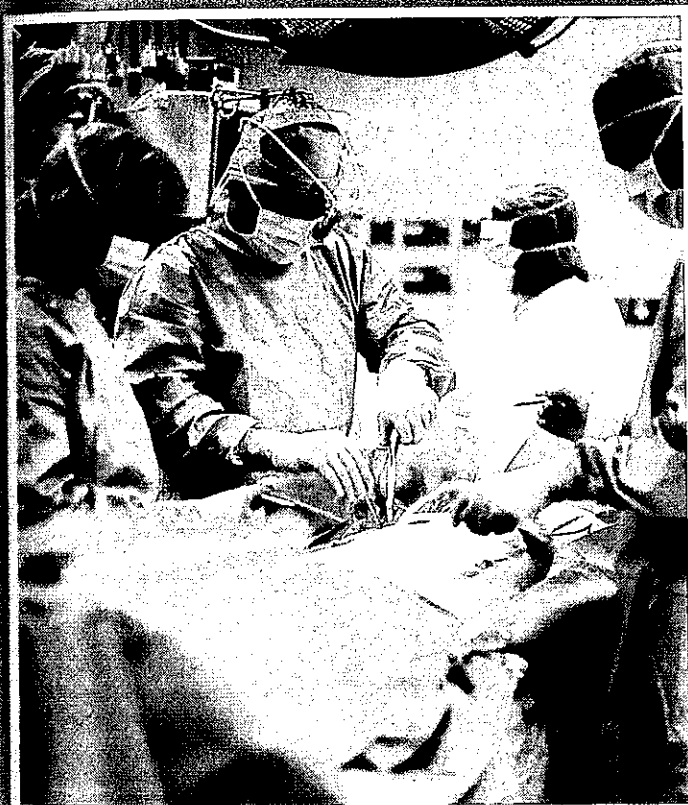


4.3 Microbes and disease



Activity

The photo below shows the patient and surgical staff in a hospital operating theatre.



Work in a group of three or four people to discuss the questions below.

- 1 List as many methods as you can think of which are used to protect the patient from infection by microbes.
- 2 In which ways are the doctors and surgical staff protected from infection from the patient?
- 3 How could microbes get into the operating theatre? How would you reduce or stop their entry into the operating theatre?

Causes of disease

Disease is a word used to describe the poor health of your body. There are many different types of diseases, and many different causes.

Diseases such as measles, chickenpox, ringworm, tetanus, malaria and the common cold are caused by microbes. These diseases are called **infectious diseases**. The photo shows a child with the infectious disease chicken pox. Infectious diseases are 'caught' by skin contact with an infected person, by breathing air containing the microbes, or by breathing in the water drops in sneezes and coughs from an infected person. Once the disease-causing microbe is inside your body, it multiplies rapidly in the warm, moist conditions there.

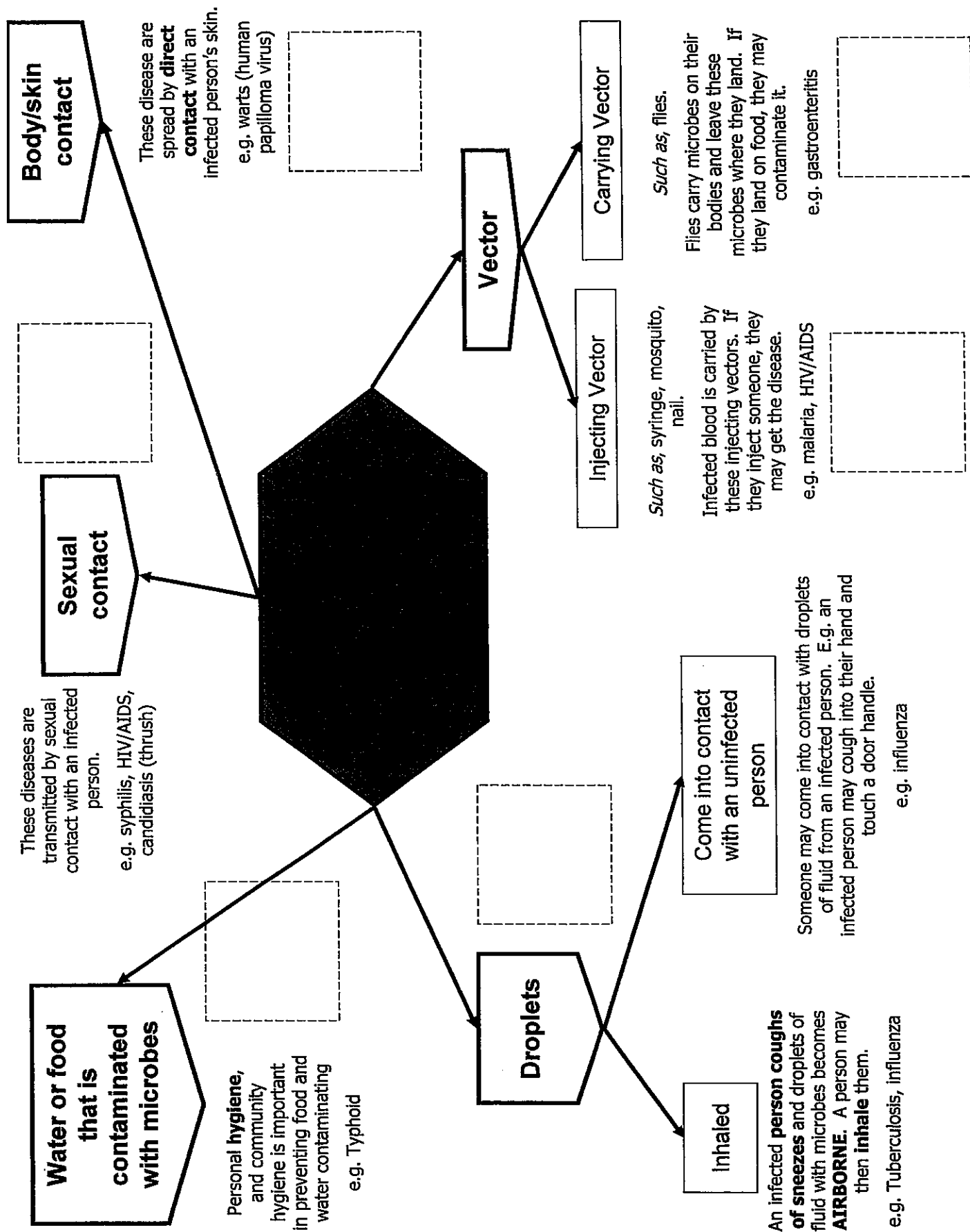


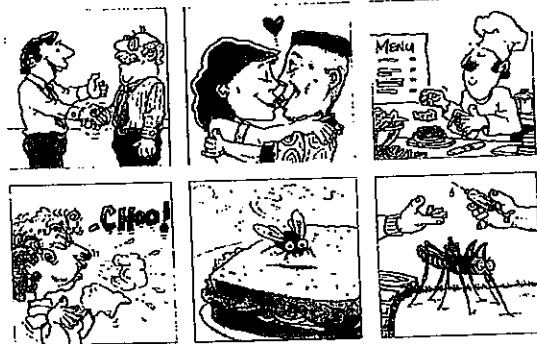
Often a poison, or **toxin**, given off by the microbe will damage or destroy your body cells and make you sick.

Other diseases (such as haemophilia, asthma, multiple sclerosis, leukaemia and some heart diseases) are not caused by microbes.

Viruses

Most people have heard of viruses, and associate them with common colds and influenza. **Viruses** are extremely small and are not made up of cells. They can form crystals like non-living matter. For these reasons, biologists argue about whether or not they are living organisms, and into which group they should be classified. However, for convenience biologists call viruses microbes.





9D Science: Microbes and Disease

1. Read the 'ACTIVITY' on p.93 and write the answers into your workbook
2. What is a disease
3. What are infectious diseases?
4. Describe how the infectious diseases are caught
5. What do the microbes do to your body once they are in?

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9D Science: Microbes and Disease

Homework Task:

Choose a disease mentioned on the flow chart given out in today's class (typhoid, HIV/AIDS, Candidiasis, Warts, tuberculosis, influenza, malaria, gastroenteritis).

Answer the following 5 questions (in full sentences and paragraphs)

1. What microbe causes the disease?
2. What are the symptoms of the disease?
3. How is the disease transmitted from person to person
4. What can you do to stop yourself from getting the disease?
5. What is the treatment for the disease

Hand in your homework on loose leaf paper, either typed or handwritten. Make sure you write the questions before answering in.

Due: 28 July 2008

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irilisation		
teurisation		
irigeration (4° C)		
ezing 0 to -18° C)		Freezing means cooling to between -10°C and -18°C. This slows microbial activity significantly. Vegetables cooled to -18°C last than vegetables cooled to 4°C. Freezing turns the water in the food any microbes that are in the food) to ice. This destroys the cells and microbes are made up of. Some microbes are resistant though have a special coating that enables them to survive at very low temperatures.
CHEMICAL /ATIVES		Sugar and salt are chemical preservatives . Microbes cannot live and reproduce) in foods with a lot of sugar or salt in them. There like jam or honey can last a long time at room temperature. Acids, like vinegar are also preservatives. Therefore pickling food vinegar kills microbes.

DISEASE		
	Non-Infectious Disease	Infectious Disease
Definition		
Can they be passed on? If so, how?		
Cause		
Example		

Method of preserving	Example of food	Description of method of preserving
HEATING <ul style="list-style-type: none"> • Sterilisation 		
HEATING <ul style="list-style-type: none"> • Pasteurisation 		
COOLING <ul style="list-style-type: none"> • Refrigeration (4°C) 		
COOLING <ul style="list-style-type: none"> • Freezing (-10 to -18°C) 		Freezing means cooling to between -10°C and -18°C. This <i>slows down microbial activity</i> significantly. Vegetables cooled to -18°C last longer than vegetables cooled to 4°C. Freezing turns the water in the food (and any microbes that are in the food) to ice. This destroys the cells that the microbes are made up of. <i>Some microbes are resistant</i> though, and have a special coating that enables them to survive at very low temperatures.
DRYING		
ADDING CHEMICAL PRESERVATIVES		<p><i>Sugar</i> and <i>salt</i> are <i>chemical preservatives</i>. Microbes cannot live (grow and reproduce) in foods with a lot of sugar or salt in them. Therefore foods like jam or honey can last a long time at room temperature.</p> <p>Acids, like vinegar are also preservatives. Therefore <i>pickling</i> foods with vinegar kills microbes.</p>
IRRADIATING		

5 Quick Questions. (in back of book)

- ① What substances are produced in the process of fermentation?
- ② Do you think fermentation would increase or decrease in rate in a warm environment?
- ③ Why can antibiotics be harmful?
- ④ What are three things produced when animal or plant matter decompose
- ⑤ Give one example of how microbes can be helpful.

Homework

Q1-8 pg 91 Review Questions, due 17th July
(write the question out).

Classwork

Complete table of information
(how to stop food from decaying).

(if have time, will do Q1-8 during class time)
- h/w will be to finish these questions & add to glossary (irradiation, pasteurisation, sterilisation, preserving)

FUNGI

1. Complete the table

Five main points about <i>Fungi</i>	Examples of diseases caused by <i>Fungi</i>
<ul style="list-style-type: none">▪▪▪▪▪	

2. Some fungi are not harmful to humans, what are these fungi known as?
3. Why is it that some fungi cause disease in humans?
4. What is a fungal spore?

PROTOZOA

1. Complete the table

Five main points about <i>Protozoa</i>	Examples of diseases caused by <i>Protozoa</i>
<ul style="list-style-type: none">▪▪▪▪▪	

2. What are the three classes of protozoa?
3. Are protozoa living or non-living organisms? Which microbe (out of bacteria, fungi, protozoa, and viruses) is non-living?
4. Look at the diagrams of the *Trypanosoma* microbe which causes **African Sleeping Sickness**, why do you think it is classified as a flagellate?
5. Describe what a vector is? What is the difference between a carrying vector and an injecting vector? Give an example of both.

21) p. 100

ANTIBIOTICS

- a) Read the page "Science Bits"
- b) explain what is an antibiotic
- c) explain how antibiotics work
- d) explain how penicillin was discovered.

p. 101

22) DO THE CHECK Questions
1 - 5.

23) p 102

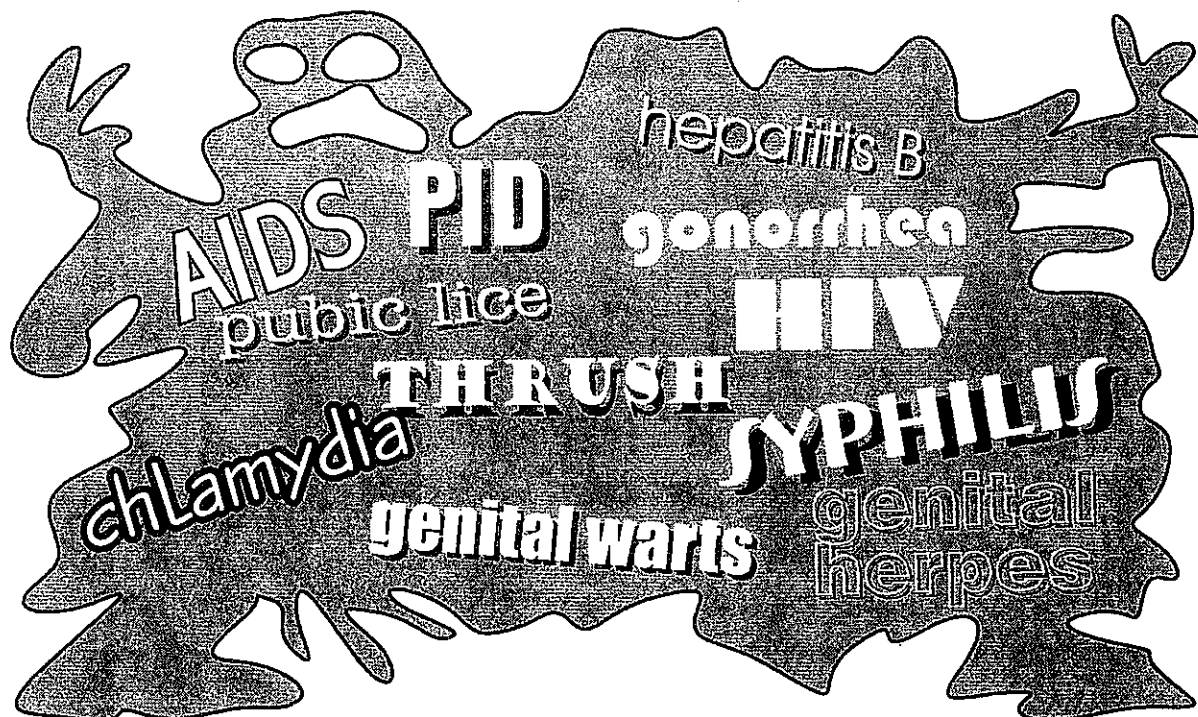
- a) Do the "main ideas" in your workbook
- b) Do the Review Qs on pages 102+103
and check your answers on
pages 278-279.

24) WRITE UP a test paper to include
and 10 Multiple Choice Questions
10 Short-Answer Questions
on a piece of paper to test
your peer in class on this chapter

25) Do the test prepared by your
peer

26) Evaluate your performance
in the test and comment
on your strength and
weakness.

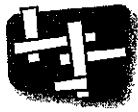
- 1 From the STIs listed, choose one to research.



While researching, use a range of resources including magazines, film, the Internet and textbooks. Research the STI by using the table below.

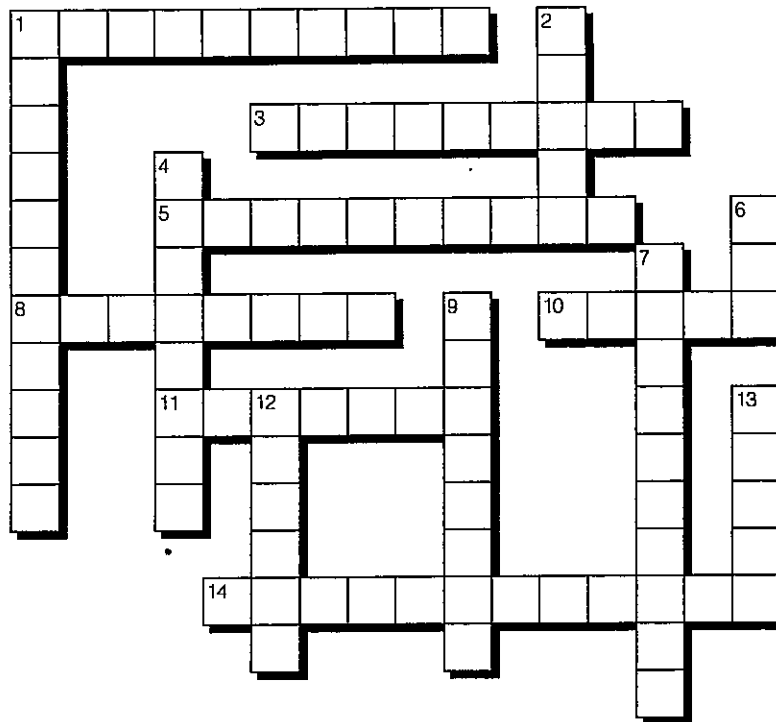
Infection or virus?	What exactly is it?	What happens to your body?	How do you get it?	How do you prevent it?	How do you treat or manage it?
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- 2 After completing the research task, produce a fact sheet aimed at Year ⁹~~10~~ students. Include pictures and the information from the table. You must come up with a design and concept plan before starting your fact sheet. It needs to be visual, attractive and targeted at Year ~~10~~⁹ students. You must use at least three sources.



Crossword

Instructions: use the clues to complete this crossword.



Across Clues

- 1 Penicillin is an example of this type of substance used against infectious bacteria (10)
- 3 Tetanus is an example of a bacterial _____ (9)
- 5 These proteins attack microbes in the body (10)
- 8 Organisms that include algae and protozoans (8)
- 10 This very simple organism can reproduce only inside another living organism (5)
- 11 Decomposers _____ matter in the environment (7)
- 14 In this process yeast convert sugar to alcohol and carbon dioxide (12)

Down Clues

- 1 These substances kill bacteria and viruses on the skin (11)
- 2 A phagocyte is a type of _____ blood cell (5)
- 4 These belong to the Moneran group of organisms (8)
- 6 A substance formed in an infection from dead bacteria, white blood cells, and body liquids (3)
- 7 Drying is a method of _____ food in which water is removed to stop decay by bacteria (10)
- 9 This method will keep meat and other fresh food in good condition for many months (8)
- 12 In the process of pasteurisation, milk is heated to 72°C and then _____ (6)
- 13 A substance often given off by a microbe when it infects your body (5)